

The spaA gene cloning of SE-9 strain by using PCR primer designed from the spaA gene sequence (SEQ ID#1) of Fujisawa strain

SEQ ID NO:3: Sense primer designed for preparation of SpaA and Δ SpaA protein by PCR amplification

Sequence length: 37 base pairs, which corresponds to the sequence of from the 79th to 106th nucleotide residues in SEQ ID NO:1

SEQ_ID_NO:4: Antisense primer designed for preparation of Δ SpaA protein by PCR amplification

Sequence length: 33 base pairs, which corresponds to the sequence of from the 1240th to 1260th nucleotide residues in SEQ ID NO:1

SEQ_ID_NO:5: Antisense primer designed for preparation of SpaA protein by PCR amplification

Sequence length: 38 base pairs, which corresponds to the sequence of from the 1855th
to 1881st nucleotide residues in SEQ ID NO:1

SEQ ID NO:7: *Erysipelothrix rhusiopathiae* spaA gene, partial cds, strain:SE-9

Sequence length: 1748 base pairs, which corresponds to the sequence of from the 107th to 1854th nucleotide residues in SEQ ID NO:1

Expression of Spa A protein of SE-9 strain

First line; SEQ ID NO:1 Nucleotide position number
Second line; SEQ ID NO:2

atg aaa aag aaa aaa cac cta ttt ccg aaa gta agt ctt atg tcg tgc 48
Met Lys Lys Lys Lys His Leu Phe Pro Lys Val Ser Leu Met Ser Cys
xxx
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

1 5 10 15
Third line; SEQ ID NO:7, SEQ ID NO:3, Antisense SEQ ID NO:5
Fourth line; Translated amino acid sequence from SEQ ID NO:7
Amino acid position number (in bold)

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Expression of Spa A protein of SE-9 strain

1 atg aaa aag aaa aaa cac cta ttt ccg aaa gta agt ctt atg tcg tgc 48
Met Lys Lys Lys Lys His Leu Phe Pro Lys Val Ser Leu Met Ser Cys
XXX
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

tta ctt tta aca gca atg cca cta caa aca gct ttt gct gat tcg aca 96
 Leu Leu Leu Thr Ala Met Pro Leu Gln Thr Ala Phe Ala Asp Ser Thr
 70 79
 | → (NcoI site) Sequence ID#3
 xxx xxx xxx xxx xxx xxx xxx cat gcc atg gct ttc gct gat tcg aca
 *** *** *** *** *** *** *** *** *** Met Ala Phe Ala Asp Ser Thr
 20 25 30

gat att tct gtg att cca cta atc ggt gaa caa gtt gga ttg ctc cca
 Asp Ile Ser Val 
 107
 → | → Sequence ID#7

 gat att tct gtg att cca cta atc ggt gaa caa gtt gga ttg ctc cca
 Asp Ile Ser Val 
 35 40 45

gtt tta cct ggg aca ggg gta cat gct cag gaa tac aac aaa atg act
 Val
 gtt tta cct ggg aca ggg ata cat gct cag gaa tac aac aaa atg act
 Ile

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gat gct tat att gaa aaa ttg gta tct cta att aat caa aaa gtg aag 240
[REDACTED] Lys [REDACTED]
206(a→g)

gat gct tat att gaa aat ttg gta tct cta att aat caa aaa gtg aag Asp Ala Tyr Ile Glu Asn Leu Val Ser Leu Ile Asn Gln Lys Val Lys
[REDACTED] Gly
65 70 75 80

ccg ttt ctt ata aat gag cca aag ggg tac caa agt ttc gaa gca gtg 288
[REDACTED]
ccg ttt ctt ata aat gaa cca aag ggg tac caa agt ttc gaa gca gtg
[REDACTED]
85 90 95

aat gaa gag att aac tcg att gta agt gaa ctt aaa aat gaa gga atg 336
[REDACTED] Asn [REDACTED]
aat gaa gag att aac tcg att gta agt gaa ctt aaa cat gaa gga atg
[REDACTED] His [REDACTED]
100 105 110

agt ctt caa aac att cac cat atg ttt aaa caa agc atc caa aac cta 384
[REDACTED]
agt ctt caa aac att cac cat atg ttt aaa caa agc atc caa aac cta
[REDACTED]
115 120 125

gca act aga atc ggc tac aga agt ttt atg cag gat gct atg tat ctt 432
[REDACTED]
gca act aga atc ggc tac aga agt ttt atg cag gat gct atg tat ctt
[REDACTED]
130 135 140

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tat tta cct gaa gcg cat gag gat ttc tta gtt tca gat tca agc gag 672
[REDACTED]
642(t→g)

tat tta cct gaa gcg cat gag gat ttc tta gtt tca gat tca agc gag
[REDACTED]
Gln

210 215 220

tat aat gac aaa cta aat aat atc aac ttt gct ttg ggt cta ggg gtc 720
[REDACTED]

tat aat gac aaa cta aat aat atc aac ttt gct ttg ggt cta ggg gtc
[REDACTED]

225 230 235 240

agc gag ttt att gac tat aac cgg ctc gaa aat atg atg gaa aaa gaa 768
[REDACTED]
758(t→c)

agc gag ttt att gac tat aac cgg ctc gaa aat atg atg gaa aaa gaa
[REDACTED]
Thr

245 250 255

ctt cat cca ctg tat ctt gaa ctt tat gct atg cgg aga aat cgc caa 816
Leu [REDACTED]

att cat cca ttg tat ctt gaa ctt tat gct atg cgg aga aat cgc caa
Ile [REDACTED]

260 265 270

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att caa gtt gta aga gat gta tat cca aac ttg gaa cgt gcg aac gcg 864
[REDACTED]
333(a→g)
att caa gtt gta aga **gat** gta tat cca aac ttg gaa cgt gcg aac gcg [REDACTED]
Gly
275 280 285

gtt gtt gaa tcc tta aag aca att aaa gat ata aaa caa aga ggg aag 912
[REDACTED] Gly [REDACTED]
gtt gtt gaa tcc tta aag aca att aaa gat ata aaa caa aga gag aag [REDACTED] Glu [REDACTED]
290 295 300

aaa cta cag gaa ctt ctt gaa att tat atc caa aga agt gga gat gtt 960
[REDACTED]
aaa cta cag gaa ctt ctt gaa att tat atc caa aga agt gga gat gtt [REDACTED]
305 310 315 320

cga aaa cca gat gta ctc caa cga ttt att gga aaa tat caa tca gta 1008
[REDACTED]
cga aaa cca gat gta ctc caa cga ttt att gga aaa tat caa tca gta [REDACTED]
325 330 335

gtt gat gaa gaa aaa aat aaa ctt caa gat tat tta gaa tca gat att 1056
[REDACTED]
gtt gat gaa gaa aaa aat aaa ctt caa gat tat tta gaa tca gat att [REDACTED]
340 345 350

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ttt gat tca tat agt gtg gat ggc gag aaa ata aga aat aaa gaa att 1104
ttt gat tca tat agt gtg gat ggc gag aaa ata aga aat aaa gaa att
355 360 365

aca ctc atc aat aga gat gca tac tta tct atg att tac aga gct caa 1152
aca ctc atc aat aga gat gca tac tta tct atg att tac aga gct caa
370 375 380

tcg att tcg gaa att aag acg att cgt gca gat tta gaa tca ctt gtc 1200
tcg att tcg gaa att aag acg att cgt gca gat tta gaa tca ctt gtc
385 390 395 400

1240
| ← Antisense
cct gaa agt
aaa tca ttc caa aat gaa gaa agt gac tct aaa gta gag cct gaa agt 1248
aaa tca ttc caa aat gaa gaa agt gat tct aaa gta gag cct gaa agt
405 410 415

The spaA gene cloning of SE-9 strain by using PCR primer designed from the spaA gene sequence (SEQ ID#1) of Fujisawa strain

1260
Sequence ID#4 | (BamHI site)
ccc gtt aaa gta iaa gga tec gcg
Stop
ccc gtt aaa gta gaa aaa cca gtt gat gaa gaa aaa cct aaa gat caa 1296
[REDACTED] Glu [REDACTED]
ccc gtt aaa gta gaa aaa cca gtt gat aaa gaa aaa cct aaa gat caa [REDACTED] Lys [REDACTED]
420 425 430
aag aag cta gtt gat caa tca aaa ccc gaa tcg aat tca aaa gaa ggg 1344
[REDACTED] Leu [REDACTED]
aag aag cca gtt gat caa tca aaa ccc gaa tcg aat tca aaa gaa ggg [REDACTED] Pro [REDACTED]
435 440 445
tgg att aag aaa gat aat aag tgg ttc tat att gag aaa tca ggt gga 1392
[REDACTED]
tgg att aag aaa gat aat aag tgg ttc tat att gag aaa tca ggt gga [REDACTED]
450 455 460
atg gca aca ggt tgg aag aag gta gca gac aaa tgg tac tac ctc gat 1440
[REDACTED] Ala [REDACTED]
atg gca aca gga tgg aag aag gta gga gac aaa tgg tac tac ctc gat [REDACTED] Gly [REDACTED]
465 470 475 480

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aat acg ggt gct ata gtt acg ggt tgg aag aag gta gca aac aaa tgg 1488
[REDACTED] Ile [REDACTED]
aat acg ggt gct atg gtt acg ggt tgg aag aag gta gca aac aaa tgg 1488
[REDACTED] Met [REDACTED]
485 490 495

tac tat ctt gaa aaa tca ggt gcg atg gca aca gga tgg aag aaa gta 1536
[REDACTED] Lys [REDACTED]
tac tac ctt gaa aac tca ggt gcg atg gca aca gga tgg aag aaa gta 1536
[REDACTED] Asn [REDACTED]
500 505 510

tca aac aag tgg tac tac ctt gaa aac tca ggt gca atg gca aca gga 1584
[REDACTED]
tca aac aag tgg tac tac ctt gaa aac tca ggt gcg atg gca aca gga 1584
[REDACTED]
515 520 525

tgg aag aaa gta tca aac aag tgg tac tac ctt gaa aat tca ggc gca 1632
[REDACTED] Lys [REDACTED]
1591(a→g)
tgg aag [REDACTED] gta tca aac aag tgg tac tac ctt gaa aat tca ggc gca 1632
[REDACTED] Arg [REDACTED]
[REDACTED] Gly [REDACTED]
530 535 540

atg gct aca gga tgg aaa aag gta gca aac aaa tgg tac tac ctt gaa 1680
[REDACTED]
atg gct aca gga tgg aaa aag gta gca aac aaa tgg tac tac ctt gaa 1680
[REDACTED]
545 550 555 560

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aac tca ggt gcg atg gca aca gga tgg aag aaa gta tcg aac aag tgg
1728

aac tca ggt gcg atg gca aca gga tgg aag aaa gta tcg aac aag tgg

565 570 575

tac tac ctt gaa aac tca ggc gca atg gct aca gga tgg aaa aag gta
1776

Val

tac tac ctt gaa aac tca ggc gca atg gca acg ggt tgg aag aaa ata

Ile

580 585 590

gca aac aaa tgg tac tac ctt gat aaa tca gga atg atg gtt aca ggt
1824

gca aat aaa tgg tac tac ctt gat aaa tca gga atg atg gtt aca ggt

600 605

tca aaa tct att gat ggt aaa aag tat gca ttt aag aac gat gga agt
1872

Phe Lys Asn Asp Gly Ser

1855

Sequence ID#7

→ | ← Antisense Sequence ID#5

tca aaa tct att gat ggt aaa aag tat gca ttt aag aac gat gga agt

Phe Lys Asn Asp Gly Ser

610 615 620

tta aaa tag
1881

Leu Lys Stop

1831

| (BamHI site)

tta aaa tag agg gat ecg cg

Leu Lys Stop

625

630